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## Intravenous Amiodarone for Treating Acute Life Threatening Arrhythmias

IN 1995 an intravenous formulation of amiodarone was approved by the FDA for treating refractory ventricular tachycardia and fibrillation (VT/VF). Intravenous amiodarone holds great promise for the emergency treatment of unstable VT/VF, and it may also be useful for the treatment of atrial fibrillation (AF) in unstable patients.

Intravenous amiodarone has a myriad of electrophysiologic effects, some of which differ from the oral formulation. Central among these effects is the prolongation of the action potential in all cardiac tissues (Class III), but intravenous amiodarone also blocks calcium channels (Class IV) and has β-adrenergic blocking actions (Class II). The magnitudes of the various electrophysiologic effects are dependent on both dose and duration of therapy, with Class IV and Class II effects predominant first. The significance of these electrophysiologic properties lies in amiodarone's antiarrhythmic effects on both supraventricular and ventricular arrhythmias.

The role of intravenous amiodarone in the management of unstable VT/VF is evolving. Although smiodarone does not yet apper in the American Heart Association's advanced cardiac life support treatment algorithm for VT/VF, emerging evidence suggests that VT/VF treatment is at least as effective as bretylium. A randomized double-blind study (involving 302 patients) found amiodarone to be as effective as bretylium, with a significantly lower incidence of hypotension in the amiodarone group (19% versus 32%). Another randomized trial, involving 504 patients in cardiac arrest from sustained VT/VF, showed that administering amiodarone in a prehospital setting was associated with a significant improvement in survival with emergency department admission compared to standard therapy. Additional small nonblinded case series suggest that amiodarone is more effective than lidocaine or procainamide as first- or second-line therapy for VT. Taken as a whole, these data support the replacement of bretylium by amiodarone as third-line therapy after defibrillation and lidocaine for unstable VT/VF and, if confirmed by further studies, perhaps establish a role for amiodarone as the primary antiarrhythmic medication.

Intravenous amiodarone has also been studied in unstable patients with atrial fibrillation. The treatment of these patients represents a difficult therapeutic challenge. Current therapies including pharmacologic or electrical cardioversion and rate control with digoxin or calcium channel blockers may be ineffective or relatively contraindicated. Small studies have suggested amiodarone is a reasonable alternative in these patients. In one study, nine critically ill patients with atrial fibrillation and ejection fractions less than 15% received intravenous amiodarone. Eight of these patients converted, and all showed ventricular rate control. Another study randomized a heterogeneous group of 42 stable and unstable patients with supraventricular tachycardias to receive intravenous amiodarone or magnesium. Of these, 36 (86%) had irregular atrial tachycardias—predominantly atrial fibrillation or flutter. Amiodarone and magnesium were equally effective for rate control; patients in the magnesium group, however, were more likely to return to sinus rhythm. Although available data do not allow conclusive recommendations for the management of atrial fibrillation in unstable patients, amiodarone is a reasonable consideration.

The side effect profile of IV amiodarone is comparable to that of other antiarrhythmics. Hypotension is the most common significant adverse reaction. Principally due to vasodilation, hypotension generally responds well to intravenous fluids or low dose dopamine. Amiodarone's β-adrenergic blocking effects can result in bradyarrhythmias, which are treated in the usual manner but may ultimately lead to the discontinuation of the drug.

Intravenous amiodarone is expensive. The pharmacy cost of a 150 mg vial exceeds $55; and the cost of a one-day infusion is about $400. Current evidence suggests that IV amiodarone is *clinically* effective for life-threatening VT/VF and *possibly* effective for patients with unstable atrial fibrillation. Whether amiodarone is a *cost*-effective solution for patients with these serious arrhythmias remains to be determined.

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## Emergency Department Management of Falls in the Elderly

THE US population is growing older, and the most rapid growth is among the oldest of the old. Falls are a substantial problem in older persons, occurring in approximately one-third of those 65 years and older.